WHAT IS CLAIMED IS:

1.   A network system for carrying out communication between a control station and a plurality of devices connected to a network, wherein such communication includes data communication which requires real-time attributes and message communication which does not require real-time attributes, and wherein the data communication includes a first data communication in which data is transmitted from the control station to the devices and data in response to this transmission is transmitted from the devices to the control station, and a second data communication in which data is transmitted from the control station at a prescribed timing, comprising:

a plurality of transmission queues for temporarily storing transmission data provided in the control station, wherein one of the queues holds transmission data for the second communication;

wherein after the first data communication is carried out in accordance with a predetermined cycle time, an appropriate switching between the message communication and the second communication is carried out in the remaining time of the cycle time to complete one cycle, whereafter the cycle is repeatedly carried out.

2.   A network system for carrying out communication between a control station and a plurality of devices connected to a network, wherein such communication includes data communication which requires real-time attributes and message communication which does not require real-time attributes, comprising:

a function provided in the control station for independently establishing a cycle time for communication;

wherein the established cycle time is referenced at each communication cycle to determine the current cycle time; and

28 wherein after the data communication is carried out, the message

29 communication is carried out in the remaining time of the established

30 cycle time to complete one cycle, whereafter the cycle is repeatedly

31 carried out.

32 3. A control station for use in a network system for carrying out

33 communication between the control station and a plurality of devices

34 connected to a network, wherein such communication includes data

35 communication which requires real-time attributes and message

36 communication which does not require real-time attributes, and wherein

37 the data communication includes a first data communication in which

38 data is transmitted from the control station to the devices and data in

39 response to this transmission is transmitted from the devices to the

40 control station, and a second data communication in which data is

41 transmitted from the control station at a prescribed timing, comprising:

42 a plurality of transmission queues for temporarily storing

43 transmission data, wherein one of the queues holds transmission data for

44 the second communication; and

45 control means for extracting appropriate data from the plurality of

46 transmission queues;

47 wherein after the first data communication is carried out in

48 accordance with a predetermined cycle time, the control means carries

49 out an appropriate switching between the message communication and

50 the second communication in the remaining time of the cycle time to

51 complete one cycle, whereafter the cycle is repeatedly carried out.

52 4. The control station of Claim 3, further comprising:

53 a function for independently establishing the cycle time; and

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54 a function for establishing the current cycle time by making

55 reference to the independently established cycle time at each

56 communication cycle.

57 5. A control station for use in a network system for carrying out

58 communication between the control station and a plurality of devices

59 connected to a network, wherein such communication includes data

60 communication which requires real-time attributes and message

61 communication which does not require real-time attributes, comprising:

62 a function for independently establishing a cycle time;

63 means for determining the current cycle time by making reference

64 to the independently established cycle time at each communication cycle,

65 wherein after the data communication is carried out, the message

66 communication is carried out in the remaining time of the cycle time to

67 complete one cycle; and

68 means for repeatedly carrying out the cycle.

69 6. A network system for carrying out data communication which

70 requires real-time attributes and message communication which does not

71 require real-time attributes, comprising:

72 a control station and a plurality of devices connected to a network;

73 wherein the control station includes a function to independently

74 establish the total volume of message data transmitted in the next cycle

75 during communication; and

76 wherein the devices carry out communication in manner that does

77 not exceed the total volume of message communication established by

78 the control station at each communication cycle.

79 7. A control station for use in a network system for carrying out

80 communication between the control station and a plurality of devices

81 connected to a network, wherein such communication includes data

82 communication which requires real-time attributes and message

83 communication which does not require real-time attributes, comprising:

84 a function to independently establish the total volume of message

85 data transmitted in the next cycle during communication; and

86 control means which carries out a control process to ensure the

87 devices carry out communication in manner that does not exceed the total

88 volume of message communication established by the control station at

89 each communication cycle.

90 8. A device for use in a network system for carrying out

91 communication between a control station and a plurality of devices

92 connected to a network, comprising:

93 a plurality of transmission queues for temporarily storing

94 transmission data;

95 means for storing transmission data in the plurality of transmission

96 queues;

97 control means for extracting appropriate data from the plurality of

98 transmission queues; and

99 transmission means for transmitting transmission data extracted by

100 the control means;

101 wherein at least one of the transmission queues holds transmission

102 data requiring priority transmission.

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